

REMARKS

Reconsideration and allowance of this Application are respectfully requested.

Upon entry of the foregoing amendment, claims 1 and 4-6 are pending in the application. Claims 2 and 3 have been cancelled without prejudice or disclaimer of the subject matter recited therein. Claim 1 has been amended to incorporate the subject matter of cancelled claims 2 and 3. These changes introduce no new matter, and their entry is respectfully requested.

The Office Action objected to the Drawings because a “Prior Art” label was not included in the legend of Figure 2. Applicants have not amended Figure 2 to include this caption because Figure 2 is not prior art. Instead, Figure 2 represents a group III nitride compound semiconductor light-emitting device that is a part of Applicants’ in-house technology, and represents an improvement over the Applicants’ previous work that does not constitute prior art under 35 U.S.C. § 102.

The Office Action rejected claims 1-6 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 5,959,307 issued to Nakamura *et al.* (“Nakamura”), U.S. Patent 6,100,545 issued to Chiyo *et al.* (“Chiyo”) and Japanese Patent 10-135514 issued to Koide *et al.* (“Koide”). Applicants traverse the rejections below.

For a reference to anticipate a claim, each element of the claim must be found in that reference. Applicants respectfully submit that Nakamura, Chiyo and Koide all fail to disclose each element of the claimed invention. In particular, each of the cited references fails to disclose the following claimed limitation of claim 1:

“...wherein said n-type clad layer is made thicker than each of said barrier layers and the thickness is in a range of 100 Å to 500 Å,

wherein said n-clad layer is formed of a material substantially the same as said barrier layer” (See amended claim 1).

Nakamura merely discloses a nitride semiconductor device having a nitride semiconductor layer structure which includes an active layer of a quantum well structure; Chiyo merely discloses a GaN type semiconductor layer having a structure which incorporates a substrate having a surface that is opposite to a GaN type semiconductor layer and is made of Ti (Abstract); and Koide merely discloses a semiconductor light emitting element and a method of manufacturing the same.

In contrast to the above-applied references, the present application discloses a group III nitride compound semiconductor light-emitting device having a light-emitting layer of a multi-layer quantum well structure composed of alternately laminated well layers and barrier layers. The device further includes, in contrast to the cited references, an n-type clad layer, which is thicker than each of the barrier layers, and the thickness is within a range of 100 Å to 500 Å.

Neither Nakamura, Chiyo nor Koide teaches the thickness of the n-clad layer being within a range of 100 Å to 500 Å, as recited in the claim 1. Therefore, each of the claimed elements of the present application is not found in the cited references, and claim 1 is not anticipated by Nakamura, Chiyo or Koide. As such, claim 1 is patentable over the applied references of Nakamura, Chiyo and Koide.

Claims 4-6 depend from claim 1. Applicants have discussed above how independent claim 1 is distinguished and allowable over Nakamura, Chiyo and Koide. As such, dependent claims 4-6 are allowable for at least the same reasons as independent claim 1, and



Further in view of their own respective features. Reconsideration and withdrawal of the rejection of claims 1-6 are respectfully requested.

All of the stated grounds of rejection have been properly traversed. In view of the foregoing, the claims and specification are in form for allowance, and such action is hereby solicited. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is requested to call the undersigned at the number provided.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached Appendix is captioned "**Version with markings to show changes made**".

Respectfully submitted,

PILLSBURY WINTHROP LLP

Caroline D. Dennison

Reg. No.: 34494

Phone: (703) 905-2047

Fax: (703) 905-2500

CDD/VPH:ksh

1600 Tysons Boulevard
McLean, Virginia 22102
Tel. (703) 905-2000

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATIONS:

The specification is changed as follows:

Change the paragraph beginning on page 1, line 12 as follows:

Fig. 2 is a [typical] sectional view showing a structure of a group III nitride compound semiconductor light-emitting device 200 according to [the conventional] related art.

Change the paragraph beginning on page 1, line 15 as follows:

The group III nitride compound semiconductor light-emitting device 200 is [considered as a] representative of [conventional-art] light-emitting devices of the type having layers of group III nitride semiconductors laminated on a substrate.

Change the paragraph beginning on page 2, line 6 as follows:

In the aforementioned light-emitting device 200, the barrier layers 162 are made substantially uniform in thickness so as to be generally in a range of 70 to 80Å. Moreover, from the point of view of improvement in color purity, the intermediate layer 14 of InGaN is provided, and the n-type clad layer 15 having the same thickness and composition as each of the [carrier] barrier layers 162 is also formed.

Change the paragraph beginning on page 2, line 13 as follows:

In the [background-art] group III nitride compound semiconductor light-emitting device such as the aforementioned light-emitting device 200, or the like, there is a problem in that the effect of confining carriers in the light-emitting layer 16 against the high carrier density n^+ layer 13 is unable to be obtained sufficiently because the thickness of the n-type clad layer 15 under the light-emitting layer 16 is substantially equal to the thickness of each of the barrier layers 162, and therefore light-emitting efficiency is low in spite of very good color purity.

Change the paragraph beginning on page 4, line 9 as follows:

According to the means of the present invention, carriers contributing to light emission can hardly run away from the light-emitting layer 16 toward the high carrier density n^+ layer 13 because the n-type clad layer 15 thicker than each of the [carrier] barrier layers is formed to be in contact with the light-emitting layer 16 of the multilayer quantum well structure. That is, the carrier confinement effect can be obtained sufficiently by the n-type clad layer 15, so that light-emitting efficiency is improved.

Change the paragraph beginning on page 6, line 13 as follows:

Fig. 2 shows a [typical] sectional view showing the structure of a group III nitride compound semiconductor light-emitting device 200 [according to the conventional art].

IN THE CLAIMS:

Please amend the following claim:

1. (Amended) A group III nitride compound semiconductor light-emitting device comprising:
a light-emitting layer of a multilayer quantum well structure composed of alternately laminated well layers and barrier layers; and
an n-type clad layer being in contact with said light-emitting layer,
wherein said n-layer clad layer is made thicker than each of said barrier layer[.] and the thickness is in a range of 100 Å to 500 Å,
wherein said n-clad layer is formed of a material substantially the same as said barrier layers.